

place in Tokyo. The newspapers did not publish the shocking fact, for example, that nearly seventeen square miles of the industrial heartland of the city had been gutted, that only shells of buildings remained. Nor did they dare to write of the numbers of the dead, the burned and maimed. They did not write that within twenty-four hours the Japanese knew that at least eighty-four thousand people had died, that possibly another fifty to one hundred thousand also were no longer among the living. City officials who knew the slum area better than most confided that there was every chance that the final death toll, although exact figures were impossible, would reach a quarter of a million!

In the great earthquake of 1923, the earth shocks and subsequent fires caused—by official count—the death of approximately one hundred thousand people. Another 43,000 persons were missing, and at least 25,000 of this number finally were added to the death toll. The earthquake trapped tens of thousands of people beneath collapsed buildings, but the fire resulting from the catastrophe moved much slower than the enormous tidal wave of flame that rolled irresistibly through Tokyo during the early morning hours of March 10th, 1945. For so quickly did this fire move, so rapidly did it consume everything in its path, so swiftly did it snuff the life from its victims, that there was little time for the shock of the attack to be fully realized.

Not even the great British air assault of Operation Gomorrah in the summer of 1943, of which I wrote in detail in my book *The Night Hamburg Died*, so eluded description. It was committed to history by the German city's Police President. Then, too, Gomorrah was a sustained attack over a period of ten days and ten nights. There was time for shock to abate, for realization to sink deeply into the senses and memories of the people involved. There was time to assemble records and documents and to gather together the many facets of the story that led to a secret document which in explicit detail recorded the events that occurred during the terrible days and nights.

At the end of that period, twelve square miles of Hamburg had become a stomach-wrenching cemetery of dead.

In approximately six hours—nearly seventeen square miles of Tokyo were burned out, and more than 100,000 people killed.

It was too fast, the shock too great, to record in de-

tail. Tokyo has been too beclouded by the flaming, boiling smoke of its own brief but savage gutting for the story to emerge without extensive research. Hamburg suffered a fire-storm, several firestorms. The characteristics were observed, dissected, committed to records.

Not until I completed the research for this volume, with the assistance of Fred Saito in Japan, who pored over official Japanese records, talked to survivors, reached back into his own memory, was I sure that it was possible to recreate the full story of those hours in Tokyo.

Many years ago I went personally through the gutted area of the Japanese capital. I flew over the city, and saw the great scars on the face of the land. Rapid reconstruction along street fronts hid much of the devastated area from the man on foot; the view from an airplane is not restricted by this façade, and the wounds are stark and real.

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I pored through volume after volume of the *United States Strategic Bombing Survey*. I went through reports of psychological studies on the effects of the attack on the Japanese. There were combat-organization histories to be studied, former B-29 pilots and crew members to interview.

I am especially indebted to the editors of *Impact* magazine, an official Army Air Force publication that carried the stamp of "Confidential" throughout its lifetime and which went out of publication when the Japanese formally surrendered in September of 1945. A group of editors—Lt. Colonel Edward K. Thompson, Lt. Colonel Robert E. Girvin, Major Maitland A. Edey, and Captains Tom Prideaux, Peter B. Greenough, Gordon G. Macnab, and Hugh Fosburgh—made *Impact* the finest military publication ever put together, and brought to the continuing history and events of World War II brilliant new perspective. Much material in this book has leaned heavily on the detailed reporting and brilliant writing of *Impact*'s staff.

It would require extraordinary callousness, when reviewing the appalling carnage caused during World War II by the bombers of the American and British air forces, to attempt appraisal of the "worst" of all those attacks. Horror, after all, is horror no matter where one looks at it, and the human mind finally reaches its saturation point and cannot measure additional fear or suffering.

What the city of Hamburg suffered is unique unto itself, and it will never be known by any other people, no matter what their tribulations. Dresden lost many more

people in a single night than died in Hamburg in ten flaming nights; yet survivors of Hamburg would gladly have chanced death in Dresden, if only to have been spared the continuing, unremitting savagery of *Gomorrah*.

And what of Berlin, where more than 25,000 people died in a single, daylight raid by 2,500 heavy bombers of the Eighth Air Force? Or Toyama, which was 99 per cent burned out in a single B-29 attack? Or Hiroshima or Nagasaki?

By whatever name it is called, whatever city suffers, Hell is Hell.

Tokyo, of course, occupies (like Hamburg or Hiroshima) a special place on the long roll of cities that were trampled by explosives and fire. On three separate occasions Tokyo suffered what is known as the "sweep conflagration," the most devastating of all fires.

The firestorm is a living *thing* of flame. It creates unbelievable winds, temperatures of 1,500 degrees F.; it hurls its fire miles into the heavens. But it is self-contained. It burns in upon itself. The winds rush toward a common center and then shriek skyward. Fire-spread is only by the limited pace of radiated heat, and outside the perimeter, many hundreds of feet from the flames, it is possible to prevent the creeping outward movement. No one survives the interior of a firestorm; those who are beyond its reach, however, are assured of survival.

The sweep conflagration is a different breed of fire. It is a swollen, maddened thing running amuck. It is not self-contained, for it runs *before the wind*. It is like a steamroller hundreds of feet high and miles wide, roaring and shrieking as it moves in a high-crested wave, bending over along the edges.

Because it is so low to the ground in comparison to the firestorm, it feeds on richer oxygen along its blazing edges. It is *hotter than the firestorm*. In Tokyo the wall of flame hovering just above the heads of terrorized, fleeing human beings reached an unbelievable temperature of more than 1,800 degrees F.! It was so hot that *heat—not fire*—shot out for hundreds of feet and struck people down as though with a great invisible scythe.

This was the Hell of Tokyo.

This was the raid of March 9-10th, 1945, in which a possible toll of a quarter of a million human beings was exacted, resulting in nearly seventeen square miles of the heart of the city slashed by fire knives into unholy ruin.

*May*  
There was another heavy incendiary attack two months later.

Nineteen square miles of Tokyo vanished as the great tidal wave of flame consumed almost everything in its path. Not nearly as many people fell victim. They had left Tokyo, abandoned their city to the B-29's, fled to the hills and mountains.

The people who survived the March 10th raid had a grim sameness about them. They were shocked into a world of retreat, drowning in a calamity too great for their senses to accept.

Some sat on the ground; some stood unmoving, like statues. They stared at the terrible, monstrous flatness where their city had been. They were not angry, or bitter, or even filled with hate. They had no emotions left; they were numb, mute.

They were just like the people who had miraculously survived Hamburg, or perhaps Berlin or Dresden. It might have been Nagoya, Osaka, or Kobe. Or perhaps Hiroshima, or Nagasaki.

It didn't matter, really.

Horror is the same everywhere.

based in the United States, could effectively attack any German foothold in South America. The specifications for the new aircraft, which called initially for a radius of action of 2,000 miles, led to two airplanes—the Boeing B-29 Superfortress and the Convair B-32 Dominator. (Technical difficulties so hampered the development of the B-32 that it was produced only in small numbers, and saw but limited combat in the Pacific in World War II.)

Thus, the primary purpose of the B-29 was not to attack the enemy in his homeland, but rather to destroy his foothold in the Americas. However, as events have proved with our other bombing aircraft, the Air Corps was infused with the doctrine of offensive air operations, and to the leaders of that Air Corps there existed not a shred of doubt that the B-29 would fulfill its ultimate role as a destroyer of cities. Indeed, in 1939, when the airplane was still on its drawing board, Colonel (later General) Carl A. Spaatz suggested that the bomber might well end up being based in Luzon, Siberia, or the Aleutians to strike at Japanese industry.

In the early days of World War II, the danger that Britain might fall to the onslaught of German arms led Air Corps strategists to draw up operational plans for attacking German industry from bases in North Africa. Underlying the whole story of the B-29, of course, was the unquestionable logic that it is far wiser and more efficient to destroy the sources of munitions, i.e., the home factories, than to keep on attacking the products.

It was in the spring of 1941 that the VLR program first assumed its definite outlines. American and British military staffs met in top-secret conferences to plan for coordinated activities should the United States become embroiled in the European war. At this time the VLR bomber—exceeding anything else planned by either of the two countries—was anticipated as the most devastating weapon of the United States. And by September of 1941, when the first specific war plans were drawn, the defensive role of the B-29 had been cast aside, and its new mission as a destroyer of factories and cities within the enemy's home country clearly established.

As envisioned in this original plan of operations, by 1944 there would be twenty-four groups of B-29's and B-32's operating from bases in Great Britain and Egypt to strike at Germany. If the planes could be spared, an additional two groups would be sent to Luzon to attack Japan.

History establishes that the war against Japan insofar as priorities were concerned ran second to the fight against Germany; this was a doctrine established clearly before Pearl Harbor. Despite the crushing Japanese successes in the early months of the war, the Army Air Forces did not vary from this position. The conflict with Japan would be primarily a defensive war in which naval forces would predominate, and only after Germany was defeated would we turn our full and combined attentions to wiping out the remainder of the Japanese Empire.

As late as the spring of 1943, the concept of the B-29 and B-32 being used almost exclusively for attack against Germany went unchallenged within the A.A.F. As plans were developed, the great bombers would shuttle between England and North Africa, hurling ten-ton loads of bombs from each plane into targets.

In March of 1943, Major General Ira C. Eaker of the Eighth Air Force, whose responsibility was development of final plans for the CBO (Combined Bomber Offensive) against German targets, requested of the Pentagon a tentative deployment schedule of B-29 groups. Washington, however, refused definite commitments at this time, or later. Not until December of 1944, only seven months before the first B-29 went into combat, did AAF Headquarters make its final and definite decision that the VLR Program would operate with Japan as the objective.

But the heavy bombardment of Europe was not the only task for which the B-29's were sought. In April of 1943, for example, the Antisubmarine Command tried to secure twenty-four of the great bombers. Also, the Navy had obtained from the A.A.F. long-range B-24's for reconnaissance and patrol, and they tried to acquire the heavy bombers. This request was an occasion of curt and angry comment from the A.A.F. Behind the scenes, the Navy protested bitterly the crash priorities for production granted the B-29; Navy authorities had claimed that this effort interfered with their own requirements, and that the B-29 should be relegated to a lesser production priority status. In view of these actions, the A.A.F. on July 7th, 1943, in a sharp retort stated that "the Army Air Forces will not discuss the allocation of B-29's to the Navy."

#### THE WEAPON

The *Manhattan Project* that produced the atomic bomb for the United States was considered the single

against Nagoya, attacking the Mitsubishi Airframe Works, to which I belonged. As soon as the air-raid warning screamed we ran to a vacant lot near the main factory buildings and dropped into 'trenches' and 'dugouts' prepared as shelter areas. Protected against bomb shrapnel and blast, we searched for the bombers; we noticed several waves of B-29's, appearing white at a height I estimated to be thirty thousand feet. The great planes maintained a steady formation, releasing their bombs in salvos aimed to 'walk' across the factory buildings from the east to the west. This was my first experience under heavy air attack, and I remember vividly the screeching sound of the falling bombs and the unbelievable sound of the bomb explosions. My ears rang and I was deafened for hours afterward."

On December 22nd, under pressure from the Pentagon, the B-29's hit the home islands—Nagoya as the target—in a daylight incendiary mission. General Arnold's staff was firmly convinced that the Japanese cities were prime targets for incendiary raids, and he had been pressing for several test fire missions. Mass attacks had been planned for six selected cities, but there still existed strong arguments between those in favor of high-explosive precision attacks—the mainstay of A.A.F. bombing in Europe—and those who were striving for a mass fiery sweep of the Japanese city and factory areas.

Four days before the incendiary strike against Nagoya, the Twentieth Bomber Command had made its first attack against the military storage area of Hankow, China, using fire bombs. The results were spectacular, and the entire heart of the target area was completely gutted.

Although there was a pressing need for a full-scale incendiary attack to provide a basis for future strikes, the initial attempts were quite unsatisfactory. The December 22nd raid spread incendiary bombs by radar through a solid cloud undercast—the results in the Mitsubishi factory disrupted things but caused no losses in production.

There were additional attacks, most of them disappointing. A heavy mission on January 3rd, 1945, put 97 of the heavy bombers on their way to Nagoya with mixed incendiary and H.E. loads in the bays. But only 57 Superfortresses bombed the primary target.

The results were inconclusive, and the Japanese, despite the heavy fires started in scattered areas, considered the damage to be "slight." In the light of subsequent events, this was perhaps the most disastrous result that raid

could have had, for on the basis of this rather ineffective mission they concluded that their fire-defense system was outstanding, and able to cope with any fires that might be started by the B-29's. Within a few short months that system literally drowned in fire.

There were some desultory raids, but on January 19th the silver bombers made a fantastic score. They struck at a target which until this time was undamaged by bombs—the vital Kawasaki factory about twelve miles west of Kobe. Here were the Akashi works, with some of Kawasaki's largest and most important factories, producing 17 per cent of all combat airframes and 12 per cent of all combat engines.

Sixty-two of the B-29's got through to the target, dumping 155 tons of bombs into the plants, and returning without loss to Saipan. The crews did not know it, but they had just turned in one of the most precise bombing strikes of the entire war, by any airplanes of any air force. Every important building, tool shop, and other facility in both airframe and engine departments was struck heavily, and most of them were smashed. *Production fell immediately by ninety per cent!* And the combine never returned to anything like its former production level.

#### SHIFT IN COMMAND

Strangely enough, this was the last mission to be ordered out by General Hansell. The day after the raid, Hansell turned over the reins of the XXI Bomber Command to Major General Curtis E. Le May, who was transferred to Saipan from a similar post with the XX Bomber Command on the Asian mainland.

The hard truth of the matter was that the B-29 strategic bombing campaign against the Japanese home islands simply wasn't paying off. The investment was fantastic, and the results weren't anything near worth the cost. In Washington, the pressure was being applied—the campaign was lagging, and no amount of juggling statistical data could hide the fact that the Japanese, although hurt, weren't being pushed that much more quickly to calling it quits.

Doubtless the Japanese would have been stunned to learn that the Pentagon was more than a little concerned over the "failure" of the B-29's to smash Japanese industry. From the viewpoint of the people in the factories and the cities, the B-29's were nothing less than a terrifying catastrophe. They could not imagine the destruction Wash-

contribution to Japan's ability to continue its fight.

The Royal Air Force in its bombing attacks against Germany determined that the fifteen most critical targets contained some 12 per cent of the German labor force. But in Japan, at least 43 per cent of the labor force was concentrated within only fourteen leading urban areas.

The concentration of industry within these urban areas was almost beyond belief. Nagoya alone produced more than 40 per cent of all Japanese aircraft engines; more than half of all machine tools were made in four cities; 30 per cent of all aircraft assembly took place in two cities; 90 per cent of electronic manufacture was concentrated in three cities.

Destroy these cities and you destroyed Japan's ability to maintain industry. One third of all Japanese industry was in the "shadow factory" system—and another third of Japanese war production came from factories that employed thirty persons or less.

How to strike at the system? Precision bombing was useless—it would call first for identifying each individual home or building among an ocean of rooftops, and such accuracy was simply impossible. Precision bombing was essential, and would remain so until the very last day of war, but against those targets that demanded this specific means of attention—isolated and key factories and the solid, modern, fire-resistant combines within the cities.

There was no doubt that the first three months of the B-29 campaign was a failure even the leaders of the XXI Bomber Command recognized that fact. Six weeks after he took over the command of the organization, a disgruntled Le May in a disparaging remark to his public-relations officer, Lt. Colonel St. Clair McKelway, grumbled that: "This outfit has been getting a lot of publicity without having really accomplished a hell of a lot in bombing results."

Le May made this statement on March 6th. Four days later the sentence was no longer valid. Le May threw away the book, made the greatest gamble any air commander has ever made or is likely ever to have a chance of making, and brought utter catastrophe to Japan. The change was the decision to forfeit all that had gone before and to institute new tactics which, for the B-29, were both extraordinary and revolutionary.

The B-29 crews learned about the change on the morning of March 9th as they filed into the Quonsets and

other buildings for the briefings on the raid. Like all briefings, it began in the usual manner. There came the sharp cry of "Attention!" Benches and chairs and shoes scraped the floor as hundreds of men rose to their feet. The group commanders and their staffs entered, clutching maps and notes, and walked to the raised platforms at the head of each room from where they would conduct the briefing.

The words are different in each of the huts, but the meaning is clear—and shocking. Perhaps one colonel starts by saying: "This time. . . ." Or he may begin with: "Our target tonight will be Tokyo. . . ." But from this point on there is close attention.

"We are throwing away the book," a colonel told his airmen, and instantly the room was just a little quieter than before, every man was sitting a bit straighter, listening carefully.

"This time we will not fly formations." A pause as the men turn to look at each other, or shrug their shoulders.

"We are going in at night. . . ."

In the B-29? At night, without formation? What the hell is this?

There is a pause that lasts longer than usual. The men lean forward.

"We will make our attacks at an altitude that extends from five thousand to seven thousand feet. . . ."

It is impossible for the men to remain quiet. There are startled exclamations, some curses. The men shift in their chairs, they wet their lips, suck nervously on cigarettes. The tension is now a living thing.

They learn that the bombs will be incendiaries, that Le May is sending the bombers in at minimum altitude with very heavy bomb loads to strew incendiaries across a ten-square-mile area in the heart of Tokyo. It will be an all-out, massive incendiary attack. It has never been done before.

"We will carry heavy bomb loads, about seven or eight tons per airplane. We can do this because you will go in to the target individually. There will be no assemblies, so you will not burn gas staging. Neither will you have to climb to high altitudes, and this also will reduce your fuel requirements. . . ."

Then comes the statement that freezes the room into absolute silence. "All guns except the tail cannon will be

removed from your aircraft; in later missions this will also be removed."

*No guns! It will be suicide!*

*What about flak when we come in on the deck; they'll murder us!*

But it had all been planned very carefully. For the sake of history, let it be stated that General Curtis E. Le May was the one man who made the ultimate decision, who went against the strong recommendations of his closest aides, and who also was to be marked as one of the most able and daring bomber commanders of the entire war.

To obtain a firsthand report of the making of this decision, with the freshness of a contemporary account, here is the story as it came out of the Marianas in 1945, under the appropriate title of:

"TURNING POINT: GENERAL LE MAY'S GREAT DECISION" . . . Against this background of poor conditions and poor results, it was decided to depart radically from the traditional doctrine of strategic bombardment. Just how radically was not known to most of the flyers until the memorable morning of 9 March when in all briefing rooms throughout the Marianas an announcement was made. It was followed by a sudden, shocked silence as the crews began to realize what they had just heard:

- (1) A series of maximum effort night incendiary attacks were to be made on major Japanese industrial cities.
- (2) Bombing altitudes would be from 5,000 to 8,000 feet.
- (3) No armament or ammunition would be carried and the size of the crew would be reduced.
- (4) Aircraft would attack individually.
- (5) Tokyo, bristling with defenses, would be the first target.

"In making this daring decision, General Le May was not motivated simply by the desire to get better performance from his crews and aircraft. Nor were these operations conceived as terror raids against Japan's civilian population. The Japanese economy depended heavily on home industries carried on in cities close to major factory areas. By destroying these feeder industries, the flow of vital parts could be curtailed and production disorganized. A general conflagration in a city like Tokyo or Nagoya might have the further advantage of spreading to some of

the priority targets located in those areas, making it unnecessary to knock them out by separate pinpoint attacks.

"Incendiary operations were not new. Several trials had been made. On some attacks a mixed load of H. E. and incendiary bombs had been used with indifferent results. On three missions prior to 9 March incendiaries alone were used. According to the Phase Analysis reports, these results, too, were indifferent. This was partly because the ballistic characteristics of incendiary clusters rendered them inaccurate when dropped from high altitudes in strong winds, partly because not enough B-29's had been available for a major strike against a big urban area. But by the start of March the 313th Wing had joined the 73rd Wing as a fully operational unit, and two groups from the 314th, recently arrived on Guam, were ready for action. Thus, the combined force now totaled more than 300 aircraft—enough to strike a spark.

"One main advantage in lowering the altitude to between 5,000 and 8,000 feet was the increased bomb load. A single B-29 flying in formation at high altitude could carry only 35 per cent of the possible bomb load of a B-29 attacking individually at the lower altitude. This was made possible, of course, because individual attacks required no assembly over the base at the mission's start or reassembly en route to the target. Aircraft would go directly from base to target and return, thus saving gas and allowing a greater bomb load. Better weather would be encountered at the lower altitude and the heavy, gas-consuming winds of high altitudes would be avoided. The weight of extra crew members, armament and ammunition would go into bombs. With the largest bomb load carried to date to Japan, each B-29 would bear six to eight tons, largely the new M-69 fire bomb, composed of an incendiary cluster containing a jelly-gasoline compound. It was felt that the weakness of Jap night fighters justified the elimination of armament.

"Time was a crucial element in the new plan.

"Jap night fighters were known to be weak, but flak losses were expected to be substantial. By making a night attack it was hoped to minimize these losses, since enemy radar gun-laying devices were thought to be comparably inefficient, and heavy AA guns would thus have to depend on searchlights for effective fire control.

"It was found that the best time for takeoff was around dusk, so that the planes could benefit by at least some

daylight for the getaway. This brought them to the target before dawn, and, most important, enabled them to make the homeward flight by daylight, thus avoiding night ditchings of battle-damaged aircraft.

"Finally, these missions had to be completed in time for the B-29's to coordinate their efforts with the naval strike at Okinawa. Since the first of the Okinawa operations was scheduled for 23 March, only a little more than two weeks were available in which to hit the four big targets—Tokyo, Nagoya, Osaka, Kobe.

"Viewed in retrospect, it appears that almost everything was in favor of the low-altitude night attacks. Nevertheless, it took extraordinary courage to risk 300 unarmed aircraft on a new type of attack directly opposed to the traditional doctrine of high-altitude precision bombing for which the B-29's had been expressly designed. The imagination, the flexibility of mind, the unwillingness to be bound by established precepts once they no longer proved applicable to the situation at hand—these qualities in our Air Force leadership contributed beyond measure to our victory, and were indeed our secret weapon.

"Probably no mission, except the first historic ones against Yawata and Tokyo, was sweated out with more anxiety than the 9 March strike on Tokyo. This time, in the event of failure, nobody could claim that we were pioneering against an unknown enemy. This time the risk of men and equipment was many times greater. This time it was later in the game and the need for decisive air action was more acute.

"On the afternoon of 10 March, when one by one the B-29's returned to the Marianas, the verdict became known. Pilots told how Tokyo 'caught fire like a forest of pine trees.'"

Thus Le May made his decision, and the die was cast for a flaming catastrophe that would descend upon the unsuspecting Japanese capital. In terms of history, in the usual procedure of committing so mighty a force to battle, the decision was not long and drawn out; although, indeed, it came very late in the scheduling of attacks.

On March 8th the field orders were out—only one day before the strike. Even though the XXI Bomber Command operated under Headquarters, Twentieth Air Force, in the Pentagon, General Arnold did not learn of the decision

to strike with revolutionary tactics until some twenty-four hours prior to the mission.

According to Le May's orders the pathfinder B-29's, leading the way, were to be armed with 180 bombs—each an M47A2, 70-pound bomb filled with napalm and set to explode at 100 feet. The napalm showered outward at a hundred feet, stuck fast to whatever it hit, and started what are known as "appliance fires"—blazes calling for the attention of fire-fighting equipment.

The pathfinders were to strike four designated aiming points, using radar to hit their exact targets. The B-29's that followed would each carry 24 500-pound bombs. These bombs scattered open in clusters at fifty feet, releasing a shower of the six-pound M-69 incendiaries.

To the crews, there was another, more ominous aspect of the briefings. Here are excerpts from that briefing of March 9th before the planes took off for Japan:

"... if you are crew members of a B-29, then you must expect to receive the roughest sort of treatment from the Japanese. What little information we have managed to accumulate indicates that if you are below the rank of lieutenant-colonel, then you will be required to perform labor as the Japanese direct and see fit. We don't have all the information we'd like so far, but what we've learned does show that if you are an officer the Japanese will likely treat you worse than they do the enlisted men. You will be interrogated more often and much more rigorously than you may have believed, because the Japanese feel that as officers you know more. If you fail to come across with the information they want—we're going to be blunt about this—then you'll stand a good chance of being given 'the business' until you break, one way or the other.

"By international law you are required to give only your name, rank, and serial number, but the Japs aren't quite so careful about respecting international law one way or the other. They are desperately anxious to find out everything they can about the B-29, and it is likely that they will go to any lengths to do so. You are to tell them as little as possible, but don't—repeat—don't try to lie to them, or to be a smart guy and try to mislead them. They're too smart for that kind of business, and they're only going to make it very rough on you.

"If you are shot down, try and get picked up by the Japanese military just as quickly as possible. The civilians will kill you—right out. They will either club or stone you

tween them. There were no true streets, only narrow, twisting alleys through which rapid flight was impossible.

The commercial structures were largely of two-story frame construction. Even the substantial fire-resistant department stores were crammed with highly combustible merchandise.

As the nation's capital, Tokyo had some load-bearing brick-wall commercial buildings similar to buildings in the United States. However, they were generally naked to assault by fire because they lacked such exposure protection devices as wire-glass windows, shutters, outside water curtains, and fire doors. Noncombustible structures of corrugated iron or asbestos cement on light steel frames were generally similar to those of Western construction. These were found, however, only in industrial plants, and they were invariably deathtraps because of their highly combustible and explosive contents.

Some lessons were taken to heart from the history of mass, destructive fires, and Tokyo (as well as all other leading cities) was dotted with the modern earthquake-resistant building that was one of the most massive buildings in the world, made of extra-heavy reinforced concrete. Roofs and floors had minimum thickness of six inches, and some had nine- to fourteen-inch concrete roofs. Heavy haunches and outside buttresses made them appear additionally strong and invulnerable.

Yet, here again, the inexplicable thinking of the Japanese asserted itself. Fire-resistive construction stopped with the basic structure of the building, for the interiors—wood-lath and plaster partitions, suspended ceilings, wood-overlay floors with air spaces beneath, wood-trim stairways, handrails, and even doorknobs—were especially susceptible to fire. And there was seldom provided any adequate protection for outside wall openings.

During the fire bombings of Japan, the ability of these structures to remain standing despite the intense fires discouraged the intelligence officers of the XXI Bomber Command, who believed that the buildings were still intact. It was not until the war was over and our teams moved into Tokyo and other cities that we learned that while the roofs and walls remained standing in a sea of devastation, the interiors of more than three out of every four such buildings were completely gutted.

#### FIRE DEFENSES

Regardless of their size, Japan's cities were densely built

up, and Tokyo with its teeming population of more than seven million people (1939 census) was actually the worst of all the country's urban areas. There were in the city some 22.5 square miles of residential area with a building density of 46 per cent—in a given area, 46 per cent of the total ground area was occupied by buildings. The industrial sections of Tokyo averaged more than 40 per cent building density, and the mixed residential and manufacturing areas—the downtown section—as high as 50 per cent.

The Japanese had yet to learn—since before the night of March 10th they had not faced B-29's carrying up to eight tons of bombs—that the incendiary-bomb load of one Superfortress could create many individual fires simultaneously. These merged with almost unbelievable speed, and within a matter of minutes an area of 600 feet by 2,000 feet was a mass of roaring flame. The lethal aspect of such a salvo was that within a very few minutes after the incendiaries sprayed away from their canisters, people in the center of the area would be completely cut off from escape.

To their grave sorrow that the Japanese had seriously misjudged our ability to attack in heavy force with the B-29's. Recognizing the danger of incendiary attack, the government had laid down some building rules that would eventually have improved the fire resistance of the cities, but these were not pressed with any enthusiasm and most of the regulations were simply ignored.

There existed a vast difference, therefore, in the defensive measures of the Japanese and German cities. A comparison of Hamburg (see *The Night Hamburg Died*) and Tokyo reveals that the German port city was probably the best defended urban area in the world. A strict and intelligent police-fire organization controlled the efforts of a people eager to comply with the rules established for their own protection. Had not Hamburg been swept by an incredible firestorm, the damage from even so severe an attack as the British carried out in Operation Gomorrah would likely have been much less.

Tokyo, unhappily, suffered seriously by its deficiency in fire protection, and the reasons for this gross failure are unusual and most interesting. Despite the combustibility of the individual Japanese homes and buildings—and thus the entire city area—there were normally many fewer fires in Tokyo than in a comparable city in the United

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has been torn away by a great blade of burning steel. There is left a jagged tear, a massive, gaping fissure in the earth itself. It pulses with fire like a live creature. Separated from the people below by several thousand feet of superheated air, the bomber crews see the streets only as avenues and rivers of fire. People burn, their skin peeled suddenly like grapes thrown into a furnace, but all of this is hidden from the air.

Even at this instant a living wall of flame sweeps through Tokyo. Not a pillar of fire, or a great mass of flame, but literally a tidal wave of flame that advanced over the earth, devouring everything combustible in its path. It leaves behind it embers and lesser fires, total death and ashes and the remnants of terror in the form of bodies charred and pulverized by heat that cannot be believed.

From the air this wall of fire is not sharp and defined, but yet it is visible. The men in the bombers look down and do not believe what they see. The base of the wave is streaked with white; the intense, impossible white that comes from an arc lamp, or the heart of a pressure-fed, white-hot blast furnace. The city is an ocean, a great churning mass burning and writhing in its own cremation.

But there is no end to it. The radarmen in the B-29's stare into their scopes and shout to the bombardiers, "Drop 'em! Drop your bombs! The scope is blank—drop 'em now!"

And another seven tons of hell spill into the city, cascading earthward to feed the creature below that is consuming Tokyo with its ravenous, unquenchable thirst of fire.

### 13 . . . WALL OF FIRE

WHAT BEGAN IN TOKYO at fifteen minutes past midnight was an incipient firestorm. This was the same kind of towering flame that had consumed the heart of the German city of Hamburg and other great urban centers in the Reich. All the conditions were ripe in Tokyo for the greatest blaze ever known: building density and the inflammability of the target area promised a firestorm reaching to fifteen or twenty thousand feet above the earth.

The concentration of bombs per square mile—and in a

period of only a few hours—exceeded in severity the attack on Hamburg by the Royal Air Force. But there was no firestorm—and all because of a wind.

Assuming combustibility and building density, a firestorm requires the creation of tens of thousands of individual fires within a limited area and in a short period of time. In merging, these fires create immediately a cyclonic effect, as do all large fires.

In the absence of a prevailing ground wind, the fires rapidly merge into great central blazes, all drawing in air from the perimeter of their flames. The suction of these flames overcomes natural prevailing weather; the several great fires join into a single blaze that is known as the firestorm. In Hamburg this fire reached fantastic proportions, producing heat on the periphery of the fire of 1,472 degrees Fahrenheit and winds of hurricane force. Everything within the firestorm was utterly consumed; if it could burn, it burned. If it could not burn, it often melted. Any living creature trapped within the periphery of the firestorm was doomed.

Within ten to twenty minutes after the original flaming X was carved into the heart of downtown Tokyo, conditions were even more favorable for a firestorm than they had been in Hamburg in July of 1943, with the one exception of an existing surface wind at the moment the fires began to leap upward.

At this period in the attack, nature itself decided the outcome of the flames. Without that wind, an enormous pillar of fire would have leaped into existence. Because of the wind, the potential firestorm was transformed at once into an even deadlier force—the sweep conflagration.

Just as Hamburg in July of 1943 became the first city in history ever to know the firestorm, so Tokyo in March of 1945 became the world's first city ever to suffer the sweep conflagration. A technical term, sweep conflagration means something quite different from "a large fire blazing out of control." What leaped into being in Tokyo was literally a tidal wave of flame.

As the fires ignited by the initial attack flashed through the inflammable Japanese homes, they shot almost instantly high above the buildings. The spread of fire was beyond belief; it was like a great forest fire blazing in dry timber. Under these conditions fire does not simply spread, it explodes as it moves along. It gathers itself into great blazing spheres and like a living creature leaps from building to building, shoots across hundreds of feet, and

smothers its objective in a great searing flash that in an instant transforms an entire block, or group of blocks, into an inferno.

Whipped by 28 mile-per-hour surface winds, the fires spread rapidly to leeward. But as they did so, they merged with new fires already started, pools of flame and heat and suction from the tens of thousands of magnesium bombs blazing fiercely, unchecked, ignored by the Japanese who fled for their lives.

The tidal wave began to gather its strength.

A pillar of flame appeared, grew to a solid wall of fire leaping high above the blazing rooftops. Then it bowed to the increasing force of the wind, and began to bend.

It bent more and more toward the ground, like the curving lip of a great breaker about to smash itself against a rocky shore. Only the breaker is alive, an enormous, thundering comber of flame. The higher the wind, the more the pillar leans over.

The more it leans over, the closer the flaming gases and searing radiated heat come to the combustible materials on the ground. And, the closer the pillar—extending rapidly on each side—comes to the ground, the richer the content of the oxygen it burns. Correspondingly, its temperature is higher. In Tokyo on this night, it exceeded the fantastic level of 1,800 degrees Fahrenheit!

The chief characteristic of this sweep conflagration, to approach it in a clinical sense, is the presence of a massed fire front, an extended wall of fire that moves to leeward, preceded by a mass of preheated vapors so hot that it can bring unconsciousness and even death to the victims caught in its path.

This is what was happening below the B-29's as they came in over Tokyo, at altitudes extending from 4,200 feet to 9,000 feet.

Below them, everywhere, incredible agony stalked the blazing streets. People were dying, roasting alive, by the thousands. But it could not be seen or felt from the air. There were the slashing flames and the fantastic mixtures of color—white and orange and crimson—the great masses of superheated, flaming gases that shot ahead of the fire wall like the jet from a gigantic furnace. There were great boiling clouds of smoke that thundered upward from the flaming carnage, smoke that momentarily obscured from view the fire, but could never hide the deep, angry, glowing, fearful red. It was as though the men looked down upon the surface of a planet still in its

throes of creation, still lashed and whipped by vast and terrible volcanic fury.

There was fear in Tokyo below the airplanes, and also hate. Many a Japanese gunner died at his post, screaming hate and pumping shells futilely into the air, until a blast of superheated air exploded his clothes and hair and body into flames.

Until the guns were overrun by heat or flame, Tokyo showed its defiance. Tracers and shells and rockets spat into the air. The guns fired until the barrels turned white hot and began to melt. No less than forty-two of the great raiders were hit; these flew home to show their scars to the men on Saipan or Guam, or perhaps Iwo or Tinian.

Nine of the great bombers fell into the city of Tokyo, to contribute by their very death to the savage flames. Another five, crippled but flyable, managed to stagger away from Tokyo, to reach out to the south to the ocean, finally to ditch on the water. All five crews were saved.

The men in the bombers had never known anything like what was happening to them. The skies over Tokyo became a sea of absolute violence, a vast devil's cauldron boiling and raging. Tremendous blows smashed at the wings and the bodies of the Superfortresses. Waves of heat danced and shimmered visibly.

The thermals that soared upward from Tokyo were too much to believe. Sixty-ton bombers were flung about like matchsticks; B-29's at five thousand feet were thrust upward in a few seconds to eight or nine thousand feet. More than likely these thermal forces were as important as the anti-aircraft fire in downing several of the bombers. If a pilot attempted to hold his bombing altitude against the violent vertical columns of superheated air, he would exceed the structural limitations of his plane. It was as if he had shoved the control column all the way forward and dived the airplane at great speed until the wings collapsed.

The thermals spread out four miles laterally from the center of the fire. Japanese fighter pilots in the air over Tokyo reported they were unable to control their light airplanes, that they were flung helplessly around the sky and could not swing into pursuit curves to attack the racing B-29's.

"Gusts from the inferno were so powerful," wrote one sergeant, "that the men were rattled around inside the ships like dice in a cup. Floor boards were uprooted. All loose equipment was hurled about like shrapnel. More

than one man was hurt that night because of those violent thermals."

B-29's at six thousand feet were caught by the shattering force of the superheated air, and flipped upside down, onto their backs. Often the planes fell several thousand feet before the shaken pilots could recover.

One bomber was caught in a particularly severe rising column of superheated air. Without warning the heavy airplane shot skyward, the pilot helpless at the controls. Within several seconds the airplane was flung from seven thousand to more than twelve thousand feet; the nose flashed upward, went straight up, and in those few seconds the B-29 was inverted at nearly two and a half miles above the city. By some miracle, the Superfortress completed its maneuver with the crew and all loose gear against the ceiling, fell down and back in a screaming loop, and streaked earthward. With both the pilot and copilot straining with all their might the airplane came out of its wild plunge only two hundred feet over Tokyo Bay. Wings bent sharply upward from the terrible strain, the B-29 leveled out at nearly 450 miles per hour and went howling out of range of the shore guns before the astonished Japanese could react.

The men in the early waves reported that, from a mile and a half above, the city looked like a vast bed of red-hot and burned-out embers. Those who flew over Tokyo in the final waves said they could almost hear the city screaming in its agony. The streets were barely visible in the midst of the sea of flames. Along the fire front the fire was a blinding white. Where the great tidal wave had passed whole city blocks glowed a dark red.

In many parts of the city even the dark lines of streets had vanished, spattered with strange flickering lights. These were burning trees and telephone poles, the fires getting the contents of a fireproof building, the scorched shell of a truck or a trolley car. Buildings had collapsed into the streets, gas lines flamed. Tokyo had become a slag heap, a garish wasteland of still-burning wreckage.

But above all else, there was one thing which brought home vividly what was happening down there in one of the world's greatest cities.

Because of the low altitudes of the mission, the B-29's remained unpressurized. The men did not need to wear their oxygen masks.

Inside the airplanes, the fumes swept in from the city.

A mist began to fill the cabins; a strange mist, blood-red in color.

The men could not bear what that mist brought with it.

Choking, spluttering, coughing—many of them vomiting forcefully—they grabbed their masks, slapped the rubber to their faces, drank in gratefully of the clean oxygen.

They could take everything else. But not the overpowering, sweet-sick stench of the burning flesh that permeated the skies two miles over the tortured city.

#### 14 . . . THE BURNING STREETS

THIS IS THE STORY of people in Tokyo who suffered the great incendiary attack of March 9-10, 1945. It is the story of the "little people," who are so rarely identified. They are like the people everywhere who were on the receiving end of the bombs. Here are a few who are not nameless.

It is one hour before midnight on March 9th. In the downtown section of Tokyo the sirens atop the public buildings are screaming their mournful, sometime shrill, warning. This is a familiar sound by now in Tokyo, but a siren is a terrible thing to hear. Almost every home in the city has a radio, and the inhabitants listen with infinite care. They do not often turn on these sets; it is impossible to obtain replacement parts. When a tube flickers and dies out, there are no new tubes. The radio is used only on special occasions—like this one, when the Americans are coming in their enormous bombers, the great silver B-29's.

Yet the people are not excited. There is no hysteria, no panic in the narrow side streets or the broad avenues. Week after week, for months the sirens have wailed across the rooftops of Tokyo. The people are accustomed to the sound. They have heard it so many times when no American bombers came that the wail of sirens is a normal part of life.

From the way the sirens sound now, at eleven P.M., it is clear that this is not a warning of attack. The sirens' warning is for *Keikai Keiho*—the Standby Alarm. There is no cause for excitement, no cause for worry.

The *Keikai Keiho* is simply a requirement of wartime life. When even one enemy airplane is sighted near the

of dizziness swept over me. I became faint, and the world began to spin.

"The children saved my life. My five-year-old daughter, Masayo, was screaming at me. Her cries aroused me from the stupor into which I had fallen. When I opened my eyes and looked up I almost screamed in horror.

"Sparks had landed on her back, and her clothes were starting to blaze. I scooped water from the nearby tank and frantically beat my hands against the flames. By a miracle I put out the fire before it could spread and harm the child. And in that same instant my boy, Shoji, screamed that he too was on fire.

"Desperately I grasped my son, lifted him bodily, and plunged him into the water tank. It saved his life.

"There was no respite. Masayo pointed at me and shrieked that I was burning. I dropped the boy, soaking wet, and leaped into the tank to douse the flames.

"For the next ninety minutes or so we kept repeating this procedure. The air was so hot that as I doused the children and put them back on the roof the water steamed almost immediately from their clothes.

"We were extraordinarily fortunate. By three o'clock in the morning the fire had reached the last houses that lay in its path. The great flames began to die out. We huddled together for another two hours, my back to the water tank, the children buried in my arms.

"Then about five o'clock I saw the first signs of dawn. I took Masayo and Shoji by the hands, and started for the staircase. It was only ten yards from where we had spent the entire night. When I arrived at the door I could not believe my eyes.

"More than a dozen people were sprawled about in grotesque positions. Every one of them was dead. The wooden parts of the staircase glowed red, smoldering with live embers. Smoke filled the hallway and the stench nearly made me vomit. It was impossible to go on down. I told the children to remain where they were and looked further down the stairway. It was horrible. Hundreds of bodies were lying on the stairs and the floors, smoking and steaming.

"We turned to the other two stairways, but we encountered the same situation. By this time we had discovered that another twelve persons had dared to weather the night on the rooftop. We were the only survivors of the entire building.

"We clustered together in a group, but everyone was

so stunned by the catastrophe that we did little talking. We did agree, however, that we must wait several more hours until everything within the school building could burn itself out before we could try to get away.

"Then, an hour later, one of the men discovered an emergency fire stairway made of iron. He led the rest of us down by walking in front and flinging away the burning and smoldering objects that had fallen on the iron stairs. As we passed the windows the smell was overpowering.

"What had happened confirmed my worst fears. The entire building had become a huge oven three stories high. Every human being inside the school was literally baked or boiled alive in heat. Dead bodies were everywhere in grisly heaps. None of them appeared to be badly charred. They looked like mannequins, some of them with a pinkish complexion.

"Strangely enough, there were only a few bodies in the playground. Evidently the asphalt surface had burst into flame, turning the playground into a wide pool of fire, and preventing escape along this route.

"But the swimming pool was the most horrible sight of all. It was hideous. More than a thousand people, we estimated, had jammed into the pool. The pool had been filled to its brim when we first arrived. Now there wasn't a drop of water, only the bodies of the adults and the children who had died.

"We gave thanks for our safety and hurried away. I had seen things that I will not forget for the rest of my life."

Senko Hayashi, who had sent her parents on to the Futaba School—never to see them again—never reached the school building herself. As she emerges from her home and runs as quickly as she can toward the Futaba School, she stops short in horror, staring with shocked eyes at a monstrous cyclone of fire that screams high into the air, lashes downward, and leaps across a fifty-yard-wide fire lane along the street of Isiwaru.

Senko spins on her heel, and runs into an alley that will take her to the school along a different route. Again she is stopped in her tracks as a twisting mass of flame boils toward her from the far end of the alley. She screams in terror and runs back to the main street. Flames are all around her, and her lungs are burning as she sucks in the superheated air. She beats constantly at her clothing, feels her lips and eyes scorching from the terrible heat.

devastation. The irony of the blaze in this area is that scores of Geisha houses and many swank restaurants remained virtually untouched by the flames, while almost every house and every factory burned to the ground.

Takeshi Nagamine, the student, also decides to stay in order to resume his work at Waseda University.

"Shortly after daybreak," Takeshi relates, "I went to visit a friend in Asakusa—or really to see if my friend and his family had survived the fires. I left about nine in the morning, and had I known the terrible slaughter that had taken place, I would never have started. Having remained in the park all night, we knew only of the great flames and that there was some fire damage, but that was all."

Takeshi reached the Kototoi Bridge several minutes later. The sight before him was overwhelming; he held his breath in horror as he saw the thousands of bodies on, beneath, and on both sides of the bridge. He threaded his way through the mass of corpses, many of them piled six and seven deep. Soldiers were already on the scene, arranging the bodies in even rows for identification.

"All the bodies were naked, but not charred," Takeshi said. "The skin color was only slightly more pink-brown than was normal, just like those of store-window mannequins. But their clothes, belongings and hair were completely burned. Many of their faces bore expressions of agony and terror. There were more than six thousand bodies around the bridge...."

Thousands of corpses floated on the surface of the river, and soldiers were hooking bodies drifting beneath the surface. The dead Japanese were everywhere—in the park, on the river banks, in the water, on the roads.

Indeed, six months later, after the war was over, Japanese police were still searching the waters beneath the Kototoi Bridge for the victims of the March 10th fires. Those that were recovered from the river bottom were buried at once in the west bank park area, which was turned into a graveyard to hold the hundreds of bodies unexpectedly discovered months later.

Takeshi crossed the Kototoi Bridge and soon reached the wide avenue that cuts through Asakusa, and then continued on down to the Ginza, Tokyo's Broadway, some four miles to the south. He passed a six-story department store on the other side of the bridge, and again the area was littered with hundreds of bodies.

"Here the bodies were charred beyond recognition," he

recalls, "indicating that the fire was intense and close. During the night, I saw the flames leaping high through the buildings in the sector."

"All the bodies I saw were black. Near the pavement I found what seemed to be two children hugging each other in their death. I went closer. They were not children, but adults, judging from the man's full-size steel helmet and other metal debris lying around. Evidently I was seeing the remains of a husband and wife, but they were terribly shrunken in size. The charred and shrunken heads looked like those of dolls. It was an incredible thing to see—even after watching the thousands of bodies on the bridge. My stomach felt as though it would never stop its churning."

Takeshi Nagamine turned to the right and walked toward his friend's home. The streets he passed along were strewn with lesser numbers of the dead. When he arrived at his friends' house he found only ashes. The entire area for block after block was completely gutted and leveled.

In dismay he went to the nearby Sensoku Primary School that he knew was used as a shelter. As he approached the buildings his hopes soared; the building stood intact. But when he stepped inside he recoiled as if from a physical blow. The interior was burned to cinders, including mounds that could only be bodies.

He went down to the basement shelter. Again he saw only bodies, more than four hundred corpses heaped and piled in grotesque positions. In despair Takeshi tried to identify the body of his friend.

"All the bodies in the basement appeared at first sight to be exactly like the mummies I had seen in museums," he said. "The entire basement had become an oven. Every person seemed to have been baked under an extraordinarily high fire. The corpses were dried up, shriveled, and black. They were completely naked. Their clothes and everything else in the basement that could burn was gone. I made several efforts to look at the faces of the bodies, but then I could stand no more. I ran up the stairs and outside, where I retched."

He sat weakly on the curb. He could see for miles across the Asakusa area. He saw the Ueno Hill, two miles to the west, and another five miles to the east across the river. He was astonished to note that the huge Buddhist temple had burned to the ground.

He trudged wearily back home, and rejoined his aunt.

That afternoon he borrowed a bicycle to travel to Honjo in the hope of finding another friend in that area.

He found only death and leveled areas. Corpses littered the streets. His friend's home was gone. He pedaled on for miles. The Wholesaler's Town in Nihonbashi was a desert of ashes. The famed Meiji-za Theater had become a slaughterhouse. Packed with more than a thousand people, it had suddenly exploded into flames and trapped everyone inside, roasting its victims.

Numb with shock at what he had witnessed, he turned to the mound of ashes that had been his home.

## AFTERMATH

WHEN THE SUN ROSE on Tokyo on the morning of March 10th, the terrible winds had died away. The day was clear and cold. Most of the great fires had died down, burning themselves out among the big concrete buildings. The rivers marked the edge of the astounding, terrible areas of destruction. The heart of Tokyo, its most densely populated area, was a garish wasteland of ash.

Here and there, poking upward from the desert, a lone building still blazed, the orange flames licking up from the wasteland. The bodies were everywhere, blackened and charred. Telephone poles stood garishly against the bleak and empty skyline, their tips still burning, glowing red-hot and giving off wisps of white smoke.

There were buildings still standing—the concrete schools, the steel factories. There were thousands of chimneys, naked and obscene. But that was all. And almost every one of the buildings were gutted inside.

Tokyo had become a monstrous, diseased flatness. The people moved slowly or squatted on the ground. They were numb, drained of emotion, distantly grateful that the fires were gone and they were alive. Their eyes teared from the smoke, their throats were raw, and many had severe blisters and burns.

The Army moved in and set up aid stations and food centers. The survivors in the gutted area lined up silently, shuffling along like mummies. They did not talk; they had no desire to talk.

There was very little noise in Tokyo. Every now and then a brick wall, standing alone, would collapse, and

there would be a light rumble of bricks. No one turned to look.

The police were busy. They took charge of the dead, collecting the corpses in great piles, pouring gasoline on the bodies, and then burning them. A blue-white smoke drifted across the city, heavy and sweetish and gut-wrenching with its smell of death.

The fire chief of Tokyo informed the Emperor that he considered the city absolutely helpless against any further attacks. The entire telephone alarm system was destroyed; it would be impossible to rebuild it for at least six months or more.

Thousands of bodies were recovered that had been boiled. It took time for this to sink in, but it was the literal truth. People in the shallower canals, where they had gone for safety, died horribly when the water in the canal boiled, and cooked the occupants to death.

"People running for refuge were trapped by the bombings ahead and around them," states an official report of the attack, "and were encircled with flames and black smoke. They looked for protection to the canals and rivers, but in some districts the shallow canals were boiling from the heat which seemed to be compressed by the wind, and the canals were full of people. In some places one swarm of humanity after another crowded into the water and by the time a third or fourth wave of frantic people had jumped, the first wave lay on the bottom. Those who survived the ordeal were burned around the head and neck by the constant rain of sparks."

"Fire-fighting equipment proved pitifully inadequate. The firemen rushed to a burning area and worked until the fire there got beyond their control, then they went elsewhere. They tried to concentrate their efforts on the big factories, but the results were almost unnoticeable. Ninety-six fire engines, 150 hand-drawn gasoline-driven pumps, and 65,000 feet of hose were burned. Eighty-five firemen were dead from the fire, 40 missing, and the casualties of the auxiliary police and the fire units came to more than 600. Forty per cent of the capital city was burned to the ground."

By official estimate, more than 130,000 people were dead.

Sixteen square miles of Tokyo were gone.

But it was only the beginning of a hurricane of fire that would soon sweep up and down the Japanese islands.

Two days after the attack, 286 of the great B-29 raid-

ers were over the city of Nagoya, attacking a three-mile-long triangular area in Japan's third largest industrial center. The crews reported that the city looked "like a gigantic bowling center with all the alleys lighted up; each flight had left an alley of flames." But Nagoya was more modern than Tokyo, filled with fire-resistant modern structures, and defended by the best fire department in Japan. Only 1.56 miles were burned out, but these included vital industrial targets. Nagoya went on the list for unfinished business.

Osaka was next—the third largest port in Japan and a center of heavy industry. On the night of March 14th, 2,240 tons of fire bombs ripped the heart of the city into a flaming holocaust. By morning the city had lost nearly nine square miles—and its greatest factories—totally destroyed.

Three days later a total of 2,300 tons of bombs poured into Kobe, sixth largest city of Japan, and a major rail and highway transportation center. Three square miles of Japan's largest concentration of shipbuilding and marine-engine plants vanished in flames.

"Fifth and last attack in the series," reported an A.A.F. editor, "was made on the return trip to Nagoya when again more than 300 B-29's dropped some 2,000 tons on the city. Overcompensating for the scattered bombing on the previous attack, the bombs were dropped in too small an area, and only .65 square miles of the city were destroyed. But nobody doubted, least of all the Japanese, that the blitz was a holocaust. In five missions more than 29 square miles of Japan's chief industrial centers were burned out beneath a rain of bombs that totaled 10,100 tons. By comparison, on the Luftwaffe's greatest fire raid on London, only 200 tons were dropped. And on the Eighth Air Force's record strike on Berlin (3 February 1945), over 1,000 heavy bombers made a 1,000-mile round trip to drop 2,250 tons. During the ten-day blitz, nearly this same tonnage was carried on each mission by only 300 B-29's. The round trip exceeded 3,200 miles.

"Our losses to AA and fighters were less than 1.3 per cent of aircraft over the target, and they were soon to drop even lower. Greatest source of alarm to our flyers were the terrific thermals, or hot-air currents, that rose from the blazing targets and sent our aircraft into a black hell of smoke. One B-29 commander related what happened over Osaka:

"We headed into a great mushroom of boiling, oily

smoke, and in a few seconds were tossed 5,000 feet into the air. It was a jerky, snappy movement. The shock was so violent that I felt I was losing consciousness. "This is it," I thought, "I can't pull out of it." Smoke poured into the ship and every light was blacked out. It smelled like singed hair, or a burning dump heap. Everybody coughed. We were tossed around for eight or ten seconds. Flak helmets were torn off our heads. The ship was filled with flying oxygen bottles, thermos jugs, ear phones, latrine cans, cigarette lighters, cans of fruit juice. We dropped down again with a terrible jolt, and in a few more seconds pulled out into the clear."

An official report discussed the morale of the B-29 crews after the blitz got under way: "The phenomenal success of our new tactics had precipitously salvaged the morale and fighting spirit of our crews by providing a degree of battle success proportionate to the effort expended....

"If our crews were encouraged by the low losses and good results of this initial phase, they truly hadn't seen the half of it yet. More and more B-29's were put on the job. Tail guns were reinstalled for minimum protection. Fighter escort was available, if needed. In May and June forces of 400 planes, and more, were launched against the big targets. By 15 June they were so completely destroyed, that the B-29's started a new campaign against more than 60 of the smaller cities. Losses continued to nose dive. In June the average B-29 loss rate per mission was .08%. In July it was .03%. In August it was .02%. In the Marianas, a low altitude incendiary attack on Japan was considered to be about the safest pastime a man could enjoy."

Tokyo became a city of absolute terror. On the night of April 13th, 327 B-29's again smashed at the capital of Japan, this time striking at the northwest quarter of the city. Each plane carried one 500-pound explosive bomb with its incendiaries, and in the first twenty planes across the target from each of the three attacking waves, the bombs were set to burst in the air—causing the Japanese to abandon fire fighting completely.

The bombs were unnecessary. So terrorized were the Japanese that there would be a repetition of the earlier holocaust that almost everyone in the attacked area fled at once. The attack was concentrated against a military-arsenal complex and was not intended as a mass, incendiary raid, but when some of the bombs fell in the

urban area near the target sites, the unopposed flames spread unchecked and burned out 11.4 square miles of the city!

Thirty-six hours later the B-29's were taking off from the Marianas for a repeat strike. Two wings smashed the factory-filled city of Kawasaki, just south of Tokyo, while the third wing went after the south Tokyo industrial area. A total of 754 tons of incendiaries ripped the guts out of more than five square miles of the city. The heart of Kawasaki, four square miles, disappeared in flames.

The B-29's hammered again and again at "the city that wouldn't burn," and an avalanche of incendiaries and high explosives poured into Nagoya. Never did that city suffer the wild fury of the fires that seared Tokyo, but so incessant and repeated were the raids that after the fourth mass incendiary strike (plus nine high-explosive bombings) the city of Nagoya was struck from the list of targets. There was nothing left to bomb. The price: 58 bombers and crews.

To the mounting terror of the Japanese, the B-29's were not yet through with Tokyo. Early on the morning of May 24th, the most powerful striking force ever to smash at Japan—520 bombers—poured 3,646 tons of bombs into the south-central urban area.

Within forty-eight hours, while south Tokyo still burned, came the most effective attack of all. A total of 3,252 tons of M-77 bombs, each weighing 500 pounds and combining a tremendous explosive force with the incendiaries, crashed into the heart of Tokyo—into the Ginza commercial area, the government and embassy districts, and the great zone surrounding the Imperial Palace.

When the last bomber left, and the fires of the two attacks had merged, another 22 square miles of the most vital areas of Tokyo were either in ashes or blazing fiercely. The bombing produced the most violent fires ever experienced in Japan. Terrible thermals and towering columns of smoke forced the last waves of B-29's to drop their missiles by radar from a height of 20,000 feet.

This last attack struck Tokyo from the list of targets. The capital had taken seven major incendiary bombings, during which 2,041 of the Superfortresses poured 11,836 tons of incendiaries into the city.

Nearly 57 square miles were totally gutted—more than half of the capital's 111 square miles of area. But it was the most important half, the industrial half, that lay in ruins.

Only a little more than three million people were left in the city. The other millions had fled, abandoning Tokyo to the B-29's.

A tidal wave of fire began to sweep over all of Japan. The great port of Yokohama was struck from the target list after only a single attack. On May 29, 459 Superfortresses unleashed 2,769 tons of bombs and wiped out 85 per cent of the entire metropolitan area.

Osaka, as big as Chicago and second in size only to Tokyo, took a series of smashing raids. After a total of 6,110 tons of bombs crashed into the industrial center, Japanese officials reported that more than 53 per cent of the entire city had been smashed and gutted. More than two million people fled into the countryside.

Kobe took only one more bombing before it was scratched from the list of targets. In a single attack more than three thousand tons of incendiaries wiped out 56 per cent of the city.

The second phase of the incendiary campaign ended in mid-June. Le May had accomplished his primary purpose—the five major industrial cities of Japan were no longer worth bombing. Of the 446 square-mile total in their municipal areas, more than 102 square miles of the most vital and industrial sections were absolutely destroyed. Nearly 80 per cent of the industrial potential had either been smashed, or knocked out of action.

The only major city that had escaped the bombings was Kyoto, fifth largest Japanese city, and a famed religious center.

The fire blitz then turned against more than sixty of the smaller Japanese cities. The results were fantastic as the B-29's began to tick off target after target, striking as many as four cities in one day, and completely demolishing their targets.

On June 17th, cities with a population ranging from 100,000 to 350,000 went to the top of the target list. In thirty days, twenty-three of these cities felt the terrible fire lash of the Superfortresses.

On July 12th, the campaign began against the final group of city targets—those with populations of less than one hundred thousand. The bomb tonnages per attack soared, reaching a peak on August 2nd, when 855 of the four-engine raiders poured a hellish concentration of 6,600 tons of bombs onto their selected targets.

The devastation was beyond belief. One night Toyama was struck as though by a giant meteor. The B-29's cir-